

CLAIMS

What is claimed is:

- 1 1. A nipple having an outer surface with at least two spaced circumferential
2 grooves for affixedly receiving a generally cylindrical shell, wherein at least one of said at
3 least two circumferential grooves is in abutting contact with at least one of an inside
4 surface of said cylindrical shell, an end surface of said cylindrical shell, and an outside
5 surface of said cylindrical shell.
- 1 2. A nipple having an outer surface with a plurality of spaced circumferential
2 grooves for affixedly receiving an end portion of a generally cylindrical shell, wherein at
3 least one of said plurality of circumferential grooves has a diameter less than an adjacent
4 one of said plurality of circumferential grooves, said end portion being affixedly received
5 in at least one of said plurality of circumferential grooves.
- 1 3. A nipple having an outer surface with a plurality of spaced circumferential
2 grooves for affixedly receiving a generally cylindrical shell, wherein said generally
3 cylindrical shell has one of a plurality of varying diameters, and is fixedly received in at
4 least one predetermined one of said pluralities of grooves, said grooves being of
5 successive increasing diameter relative to said generally cylindrical shell.
- 1 4. A permanently attached hose coupling, for a pressurized conduit end, having a
2 generally tubular nipple and a generally cylindrical shell permanently attached to said
3 nipple and generally surrounding said conduit end, said nipple having a longitudinal axis,
4 a first end, a second end, a plurality of circumferential grooves located between said first

5 and said second ends, a bore extending from said first end to said second end, and an
6 insert portion adjacent said plurality of grooves inserted into said conduit end;

7 wherein said grooves are dimensioned for affixedly receiving at least one
8 of an inside surface, an end surface and an outside surface of said generally
9 cylindrical shell; and

10 said grooves comprising:

11 a first groove with a generally flat base portion parallel with said
12 longitudinal axis, a first substantially vertically oriented sidewall, and a second
13 substantially vertically oriented sidewall having a maximum radial extent less
14 than said first sidewall;

15 a second groove adjacent said first groove, with a generally flat base
16 portion parallel with said longitudinal axis having a diameter less than said first
17 groove base portion, a first substantially vertically oriented sidewall having a
18 maximum radial extent similar to said first groove second sidewall, and a second
19 substantially vertically oriented sidewall having a maximum radial extent less
20 than said second groove first sidewall; and

21 a third groove adjacent said second groove, with a generally flat base
22 portion parallel with said longitudinal axis having a diameter less than said second
23 groove base portion, a first substantially vertically oriented sidewall having a
24 maximum radial extent similar to said second groove second sidewall and a
25 second substantially vertically oriented sidewall having a maximum radial extent
26 greater than said third groove first sidewall.

1 5. The hose coupling as in claim 4 wherein said first groove second sidewall and
2 said second groove second sidewall have a contoured top portion.

1 6. The hose coupling as in claim 4 wherein said first groove second sidewall and
2 said second groove second sidewall have an angled top portion.

1 7. The hose coupling as in claim 4 wherein said insert portion has a plurality of
2 spaced, circumferentially extending, frusto-conically shaped protrusions on the outer
3 surface thereof.

1 8. The hose coupling as in claim 7 wherein one of said plurality of spaced
2 protrusions is positioned approximately equidistant between said third groove and said
3 second end and has a maximum radial extent greater than that of each of the others of
4 said plurality of protrusions.

1 9. The hose coupling as in claim 4 wherein said generally flat base portion of each of
2 said plurality of circumferential grooves has a series of surface disruptions along its
3 circumference.

1 10. The hose coupling as in claim 4 wherein the outer surface of said third groove
2 second substantially vertically oriented sidewall has threads for attachment with said
3 generally cylindrical shell.

1 11. A permanently attached hose coupling, for a pressurized conduit end, having a
2 generally tubular nipple and a generally cylindrical shell permanently attached to said
3 nipple and generally surrounding said conduit end, said nipple having a longitudinal axis,
4 a first end, a second end, a plurality of circumferential grooves located between said first

5 and said second ends, a bore extending from said first end to said second end, and an
6 insert portion adjacent said plurality of grooves inserted into said conduit end;

7 wherein said grooves are dimensioned for affixedly receiving at least one
8 of an inside surface, an end surface and an outside surface of said generally
9 cylindrical shell; and

10 said grooves comprising:

11 a first groove with a generally flat base portion parallel with said
12 longitudinal axis, a first substantially vertically oriented sidewall, and a second
13 substantially vertically oriented sidewall having a maximum radial extent less
14 than said first sidewall; and

15 a second groove adjacent said first groove, with a generally flat base
16 portion parallel with said longitudinal axis having a diameter less than said first
17 groove base portion, a first substantially vertically oriented sidewall having a
18 maximum radial extent similar to said first groove second sidewall, and a second
19 substantially vertically oriented sidewall having a maximum radial extent greater
20 than said second groove first sidewall.

1 12. The hose coupling as in claim 11 wherein said insert portion has a plurality of
2 spaced, circumferentially extending, frusto-conically shaped protrusions on the outer
3 surface thereof.

1 13. The hose coupling as in claim 12 wherein one of said plurality of spaced
2 protrusions is positioned approximately equidistant between said second groove and said
3 second end and has a maximum radial extent greater than that of each of the others of
4 said plurality of protrusions.

1 14. The hose coupling as in claim 11 wherein said generally cylindrical shell has a
2 first end with an inwardly directed portion having an annular surface in an abutting
3 relationship with one of said plurality of circumferential grooves for said permanent
4 attachment.

1 15. The hose coupling as in claim 14 wherein said inwardly directed portion is located
2 at the longitudinal inner end of said generally cylindrical shell.

1 16. The hose coupling as in claim 14 wherein said inwardly directed portion is located
2 on the inside surface of said generally cylindrical shell.

1 17. The hose coupling as in claim 11 wherein said generally cylindrical shell has a
2 first end and a second end, said first end having a turned-in portion generally directed
3 towards said second end.

1 18. The hose coupling as in claim 17 wherein the outer surface of said turned-in
2 portion is in affixed abutment with said second groove first sidewall.

1 19. The hose coupling as in claim 11 wherein the inside surface of said generally
2 cylindrical shell affixedly abuts said first and said second sidewalls of said second
3 groove.

1 20. A hose coupling having a generally tubular nipple for separate fixed attachment
2 with one or more generally cylindrical shells, said nipple having a longitudinal axis, first
3 and second ends, a series of circumferential grooves located between said first and said
4 second ends, a longitudinal through bore, and an insert portion adjacent said series of
5 grooves for insertion into said conduit;

6 wherein each of said series of circumferential grooves fixedly receives at
7 least one of an inside surface, an end surface and an outside surface of said one or
8 more generally cylindrical shells and each of said series of circumferential
9 grooves has a base portion, a first substantially vertically oriented sidewall
10 adjacent said base portion, and a second substantially vertically oriented sidewall,
11 positioned adjacent said base portion on the side opposite of said first sidewall
12 and has a maximum radial extent less than said first sidewall.

1 21. The hose coupling as in claim 20 wherein said generally cylindrical shell has a
2 first end with an inwardly directed portion having an annular surface in an abutting
3 relationship with one of said at least two circumferential grooves for said permanent
4 attachment.

1 22. The hose coupling as in claim 21 wherein said inwardly directed portion is located
2 at the longitudinal inner end of said generally cylindrical shell.

1 23. The hose coupling as in claim 21 wherein said inwardly directed portion is located
2 on the inside surface of said generally cylindrical shell.

1 24. The hose coupling as in claim 20 wherein said generally cylindrical shell has a
2 first end and a second end, said first end having a turned-in portion generally directed
3 towards said second end.

1 25. The hose coupling as in claim 24 wherein the outer surface of said turned-in
2 portion is in affixed abutment with said first sidewall.

1 26. The hose coupling as in claim 20 wherein the inside surface of said generally
2 cylindrical shell affixedly abuts said first and said second sidewalls.

1 27. A generally tubular nipple having a longitudinal axis, a first end, a second end, an
2 outer surface with a plurality of circumferential grooves, located between said first and
3 said second ends, for affixedly receiving a generally cylindrical shell, and a bore
4 extending from said first end to said second end;

5 wherein said plurality of circumferential grooves are dimensioned for
6 affixedly receiving at least one of an inside surface, an end surface and an outside
7 surface of said generally cylindrical shell; and

8 said plurality of grooves comprising:

9 a first groove with a generally flat base portion parallel with said
10 longitudinal axis, a first generally vertically oriented sidewall, and a second
11 generally vertically oriented sidewall having a maximum radial extent less than
12 said first sidewall;

13 a second groove adjacent said first groove, with a generally flat base
14 portion parallel with said longitudinal axis having a diameter less than said first
15 groove base portion, a first generally vertically oriented sidewall having a
16 maximum radial extent substantially equal to said first groove second sidewall,
17 and a second generally vertically oriented sidewall having a maximum radial
18 extent less than said second groove first sidewall; and

19 a third groove adjacent said second groove, with a generally flat base
20 portion parallel with said longitudinal axis having a diameter less than said second
21 groove base portion, a first generally vertically oriented sidewall having a
22 maximum radial extent substantially equal to said second groove second sidewall

23 and a second generally vertically oriented sidewall having a maximum radial
24 extent greater than said third groove first sidewall.

1 28. The generally tubular nipple as in claim 27 further including an insert portion
2 located between said third groove and said second end and has a plurality of spaced,
3 circumferentially extending, frusto-conically shaped protrusions on the outer surface
4 thereof.

1 29. The generally tubular nipple as in claim 27 wherein one of said plurality of spaced
2 protrusions is positioned approximately equidistant between said third groove and said
3 second end and has a maximum radial extent greater than that of each of the others of
4 said plurality of protrusions.

1 30. The generally tubular nipple as in claim 27 wherein said generally flat base
2 portion of each of said plurality of circumferential grooves has a series of surface
3 disruptions along its circumference.

1 31. The generally tubular nipple as in claim 27 wherein the outer surface of said third
2 groove second substantially vertically oriented sidewall has threads for attachment with
3 said generally cylindrical shell.

1 32. A generally tubular nipple having a longitudinal axis, a first end, a second end, an
2 outer surface with at least two circumferential grooves located between said first and said
3 second ends for affixedly receiving a generally cylindrical shell, and a bore extending
4 from said first end to said second end;

5 wherein said at least two circumferential grooves are dimensioned for
6 affixedly receiving at least one of an inside surface, an end surface and an outside
7 surface of said generally cylindrical shell; and

8 said at least two circumferential grooves comprising:

9 a first groove with a generally flat base portion parallel with said
10 longitudinal axis, a first generally vertically oriented sidewall, and a second
11 generally vertically oriented sidewall having a maximum radial extent less than
12 said first sidewall; and

13 a second groove adjacent said first groove, with a generally flat base
14 portion parallel with said longitudinal axis having a diameter less than said first
15 groove base portion, a first generally oriented sidewall having a maximum radial
16 extent generally equal to said first groove second sidewall, and a second generally
17 vertically oriented sidewall having a maximum radial extent greater than said
18 second groove first sidewall.

1 33. The generally tubular nipple as in claim 32 further including an insert portion
2 located between said second groove and said second end and has a plurality of spaced,
3 circumferentially extending, frusto-conically shaped protrusions on the outer surface
4 thereof.

1 34. The generally tubular nipple as in claim 33 wherein one of said plurality of spaced
2 protrusions is positioned approximately equidistant between said second groove and said
3 second end and has a maximum radial extent greater than that of each of the others of
4 said plurality of protrusions.

1 35. The generally tubular nipple as in claim 32 wherein said generally flat base
2 portion of each of said at least two circumferential grooves has a series of surface
3 disruptions along its circumference.

1 36. The generally tubular nipple as in claim 32 wherein the outer surface of said
2 second groove second substantially vertically oriented sidewall has threads for attachment
3 with said generally cylindrical shell.

1 37. A generally tubular nipple having a longitudinal axis, a first end, a second end, an
2 outer surface with a series of circumferential grooves located between said first and said
3 second ends for affixedly receiving a generally cylindrical shell, and a bore extending
4 from said first end to said second end;

5 wherein said series of circumferential grooves are dimensioned for
6 affixedly receiving at least one of an inside surface, an end surface and an outside
7 surface of said generally cylindrical shell; and

8 said series of grooves comprising:

9

10 a first groove with a generally flat base portion parallel with said
11 longitudinal axis, a first substantially radially directed sidewall, and a second
12 substantially radially directed sidewall;

13 a second groove adjacent said first groove, with a generally flat base
14 portion parallel with said longitudinal axis having a diameter less than said first
15 groove base portion, a first substantially radially directed sidewall, having a
16 maximum radial extent generally equal to said first groove second sidewall, and a
17 second substantially radially directed sidewall; and

18 a third groove adjacent said second groove, with a generally flat base
19 portion parallel with said longitudinal axis having a diameter less than said second
20 groove base portion, a first substantially radially directed sidewall, having a
21 maximum radial extent generally equal to said second groove second sidewall,
22 and a second substantially radially directed sidewall.

1 38. The generally tubular nipple as in claim 37 wherein said first groove second
2 sidewall and said second groove second sidewall have a contoured top portion.

1 39. The generally tubular nipple as in claim 37 wherein said first groove second
2 sidewall and said second groove second sidewall have an angled top portion.

1 40. The generally tubular nipple as in claim 37 further including an insert portion
2 located between said third groove and said second end and has a plurality of spaced,
3 circumferentially extending, frusto-conically shaped protrusions on the outer surface
4 thereof.

1 41. The generally tubular nipple as in claim 40 wherein one of said plurality of spaced
2 protrusions is positioned approximately equidistant between said third groove and said
3 second end and has a maximum radial extent greater than that of each of the others of
4 said plurality of protrusions.

1 42. The generally tubular nipple as in claim 37 wherein said generally flat base
2 portion of each of said series of circumferential grooves has a series of surface
3 disruptions along its circumference.

1 43. The generally tubular nipple as in claim 37 wherein the outer surface of said third
2 groove second substantially vertically oriented sidewall has a series of threads for
3 attachment with said generally cylindrical shell.

1 44. A generally tubular nipple having a longitudinal axis, a first end, a second end, an
2 outer surface with at least two circumferential grooves located between said first and said
3 second ends for affixedly receiving a generally cylindrical shell, and a bore extending
4 from said first end to said second end;

5 wherein said at least two circumferential grooves are dimensioned for
6 affixedly receiving at least one of an inside surface, an end surface and an outside
7 surface of said generally cylindrical shell; and

8 said at least two circumferential grooves comprising:

9 a first groove with a generally flat base portion parallel with said
10 longitudinal axis, a first generally radially directed sidewall, and a second
11 generally radially directed sidewall; and

12 a second groove adjacent said first groove, with a generally flat base
13 portion parallel with said longitudinal axis having a diameter less than said first
14 groove base portion, a first generally radially directed sidewall having a maximum
15 radial extent substantially equal to said first groove second sidewall, and a second
16 generally radially directed sidewall.